

# Tetrachloroethene Pathway Map (Anaerobic)

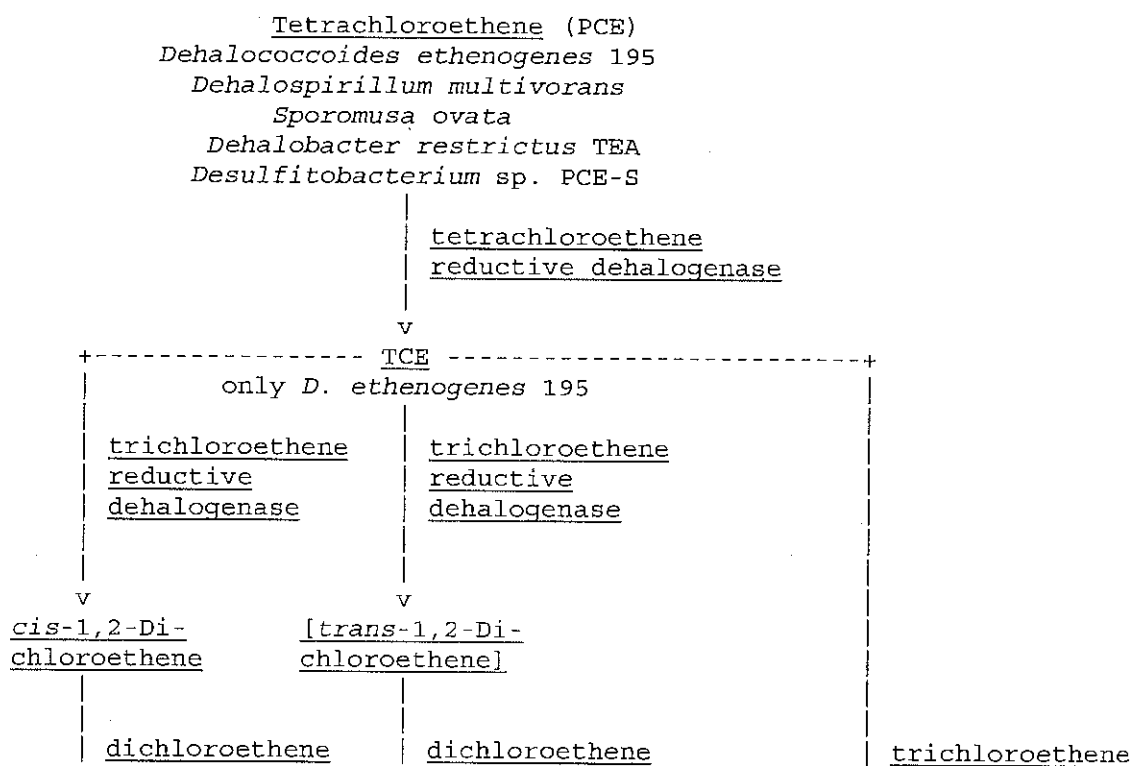
[[Compounds and Reactions](#)] [[BBD Main Menu](#)]

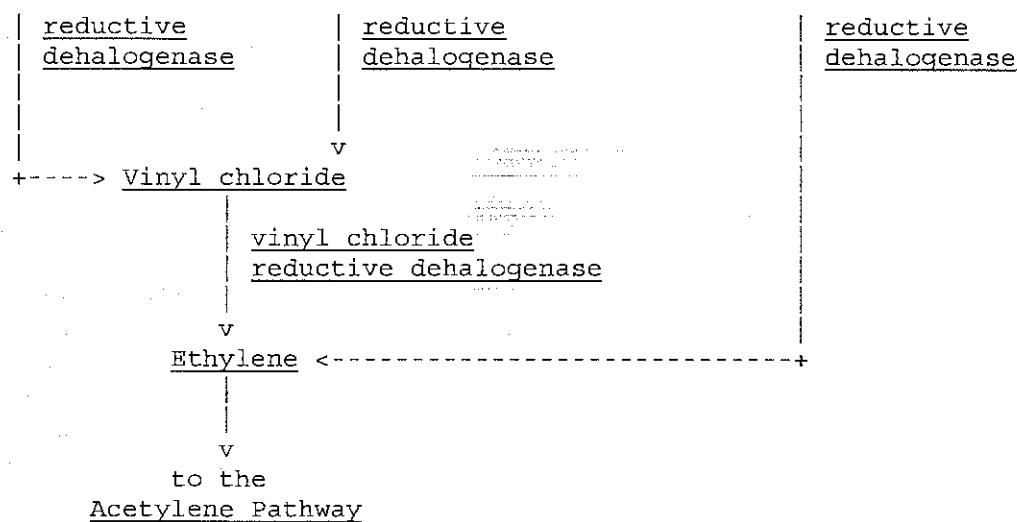
This pathway was contributed by **Lynda Ellis** and **Sean Anderson**, University of Minnesota.

Tetrachloroethene, also known industrially as perchloroethylene (PCE), is a good solvent used to clean machinery, electronic parts, and clothing. It and trichloroethene (TCE) are suspected carcinogens and some of the most abundant environmental pollutants of groundwater in the United States. In some groundwater, they undergo reductive dechlorination catalyzed by anaerobic bacteria that yields vinyl chloride, a potent human carcinogen. Removal by dumping or air stripping is now largely disallowed and this has focused efforts on biological methods of PCE and TCE remediation in soil and water. Aerobic TCE biodegradation pathways are found in the UM-BBD.

Anaerobic pathways are less well-understood. Only the first enzyme in this pathway has been isolated; in *Dehalospirillum multivorans* it also catalyzes the reductive dehalogenation of trichloroethene to *cis*-1,2-dichloroethene (Neumann et al., 1996). Other organisms implicated in anaerobic PCE biodegradation include *Sporomusa ovata* (Terzenbach & Blaut, 1994), and *Dehalobacter restrictus* TEA (Wild et al., 1996). Most organisms studied convert trichloroethene to *cis*-1,2-dichloroethene (DCE); *Dehalococcoides ethenogenes* 195 is reported to also produce the *trans* isomer. TCE can be reductively dehalogenated (through both *cis* and *trans* DCE) by the CO dehydrogenase from *Methanosarcina thermophila* (Jablonski & Ferry, 1992). All reactions in *Dehalococcoides ethenogenes* 195, as well as the name of this organism, are proposed (Maymo-Gatell et al., 1997).

The following is a text-format anaerobic tetrachloroethene pathway map. Organisms which can initiate the pathway are given, but other organisms may also carry out later steps. Follow the links for more information on compounds or reactions. This map is also available in [graphic \(9k\)](#) format.





---

**[Compounds and Reactions] [BBD Main Menu]**

Page Author(s): Lynda Ellis and Sean Anderson

October 11, 2011 [Contact Us](#)

© 2011, University of Minnesota.  
All rights reserved.

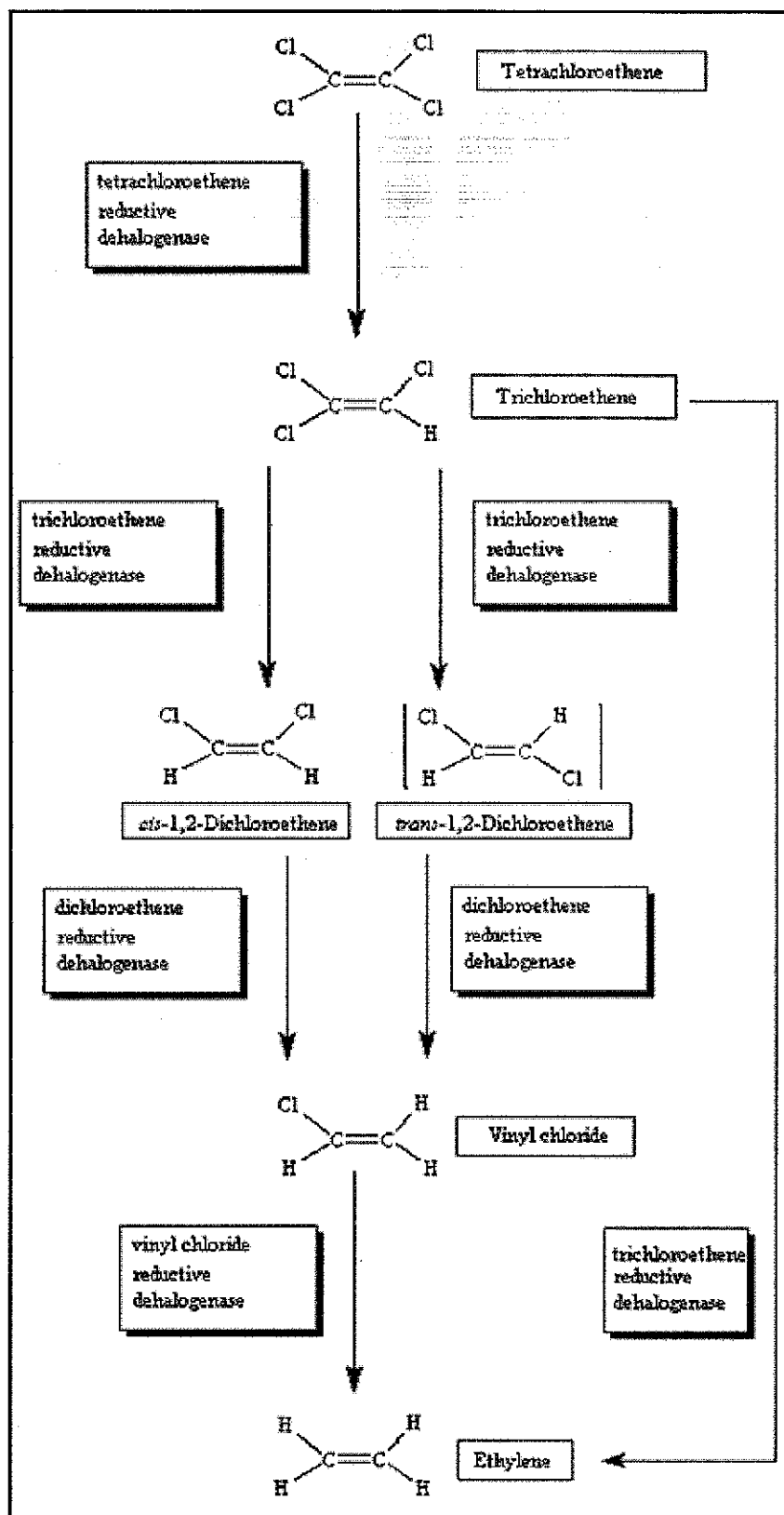
[http://umbbd.msi.umn.edu/tce2/tce2\\_map.html](http://umbbd.msi.umn.edu/tce2/tce2_map.html)

# Anaerobic Tetrachloroethene Graphical Pathway Map

[\[Compounds and Reactions\]](#) [\[Text Map\]](#) [\[BBD Main Menu\]](#)

---

Click on the boxed compound or enzyme names for further information.



Click on the boxed compound or enzyme names for further information.

[\[Compounds and Reactions\]](#) [\[Text Map\]](#) [\[BBD Main Menu\]](#)

Page Author(s): Lynda Ellis and Sean Anderson

August 15, 2011 Contact Us

© 2011, University of Minnesota.  
All rights reserved.

[http://umbbd.msi.umn.edu/tce2/tce2\\_image\\_map.html](http://umbbd.msi.umn.edu/tce2/tce2_image_map.html)